

## CLAIMS

1. A constant-voltage circuit for  
5 converting an input voltage provided to an input  
terminal of said constant-voltage circuit into a  
predetermined constant voltage, and for providing  
said constant voltage to a load, comprising:
  - a reference voltage generating circuit
  - 10 unit for generating and outputting a predetermined  
reference voltage;
  - an output voltage detecting unit for  
detecting said constant voltage, and generating and  
outputting a voltage that is proportional to said  
15 detected voltage;
  - an output transistor for outputting a  
current provided from said input terminal to said  
load according to a control signal;
  - an error amplifying circuit unit for  
20 providing said control signal for controlling  
operations of said output transistor so that said  
proportional voltage becomes equal to said reference  
voltage;
  - an output current detecting unit for  
25 detecting said current output from said output

transistor, and generating and outputting a proportional current that is proportional to the detected current;

5 a first resistance connected to said output voltage detecting unit;

a proportional current supply circuit unit for supplying said proportional current, which is proportional to the output current, from said output current detecting unit to said first resistance;

10 a second resistance connected between said output transistor and said load; and

a capacitor connected to a junction where said second resistance and said load are connected; wherein said second resistance and said capacitor 15 constitute a phase compensating circuit unit for carrying out phase compensation for said error amplifying circuit unit.

2. The constant-voltage circuit as claimed 20 in claim 1, wherein a resistance value of said first resistance is set such that a product of the resistance value and said proportional current provided by said output current detecting unit becomes equal to or less than a voltage drop through 25 said second resistance.

3. The constant-voltage circuit as claimed in claim 1, wherein said output current detecting unit comprises a transistor for output current detection for outputting said proportional current that is proportional to the current output from said output transistor according to the control signal from said error amplifying circuit unit using a current provided to said input terminal.

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4. The constant-voltage circuit as claimed in claim 3, wherein said proportional current supply circuit unit comprises a current mirror circuit, to which the current output from the said transistor for output current detection is provided.

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5. The constant-voltage circuit as claimed in claim 4, wherein said proportional current supply circuit unit comprises a stack type current mirror circuit.

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6. The constant-voltage circuit as claimed in claim 4, wherein said proportional current supply circuit unit comprises two current mirror circuits 25 that are cascaded.

7. The constant-voltage circuit as claimed in claim 4, wherein said proportional current supply circuit unit comprises a Wilson type current mirror circuit.

8. The constant-voltage circuit as claimed in claim 4, wherein said proportional current supply circuit unit comprises:

10 an operation amplifying circuit, wherein the output of said output transistor is provided to one of input terminals of the operation amplifying circuit, and the output of said transistor for output current detection is provided to another 15 input terminal of the operation amplifying circuit;

a current control transistor for controlling the current output from said transistor for output current detection according to an output of said operation amplifying circuit, and for 20 outputting a control current; and

a current mirror circuit that inputs said control current output by said current control transistor, and for outputting a current proportional to said control current to said first 25 resistance.

9. The constant-voltage circuit as claimed in claim 1, wherein an internal resistance of said capacitor is small.

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10. The constant-voltage circuit as claimed in claim 7, wherein said capacitor is a ceramic capacitor.

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11. The constant-voltage circuit as claimed in claim 1, wherein a resistance value of said second resistance is between 50 m $\Omega$  and 10  $\Omega$ .

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12. The constant-voltage circuit as claimed in claim 1, wherein said second resistance is formed by wiring resistance.

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13. The constant-voltage circuit as claimed in claim 1, wherein said reference voltage generating circuit unit, the output voltage detecting unit, the output transistor, the error amplifying circuit unit, the output current detecting unit, the first resistance, and the proportional current supply circuit unit are integrated as an IC.

14. The constant-voltage circuit as  
claimed in claim 1, wherein said reference voltage  
generating circuit unit, the output voltage  
5 detecting unit, the output transistor, the error  
amplifying circuit unit, the output current  
detecting unit, the first resistance, the  
proportional current supply circuit unit, and the  
second resistance are integrated as an IC.

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15. The constant-voltage circuit as  
claimed in claims 1, wherein said first resistance  
is connected between said output transistor and said  
output voltage detecting unit.

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